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SURVEILLANCE

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Project: #ST-8
Program Element: #62301E
USDR&E Mission Area: 530

Title: Space Object Identification
Title: Strategic Technology
Budget Activity: 1. Technology Base

- F. DETAILED BACKGROUND AND DESCRIPTION: The goal of this project is to develop and demonstrate advanced techniques for high payoff capabilities in space object identification. The Compensated Imaging System is designed to obtain near real time resolution satellites to assist in determining their function and evaluating any posed threat. With no compensation, only gross features can be observed with ground-based telescopes due to atmospheric turbulence distortion. The Compensated Imaging System not only provides useful images of satellites, but also is a convincing demonstration that optics is a viable technology. This optical technology will permit the development of several radically new defense concepts, including space-based communication systems. The Compensated Imaging System will be operated on a routine basis with the USAF Strategic Air Command/Aerospace Defense Command. This will end a productive, thirteen year development effort by DARPA in new technology for Space Object Identification. Historically, this effort has produced a sensor and two systems which are now providing uniquely.
- The Compensated Imaging System complements these systems by providing visual images of a quality that was generally believed to be impossible prior to 1975.
- G. RELATED ACTIVITIES: A USAF Program Management Directive has been generated for planning the transition of compensated imaging technology into Ground Electro-Optical Deep Space Surveillance (GEODSS) sites. Operational procedures and interface relationships have been established between USAF and DARPA for joint operations at the combined ~~ARPA-Military Space Surveillance and Tracking and Identification Facility (MSTIF)~~.
- H. WORK PERFORMED BY: Ninety-eight percent of the effort is performed by private industry. The primary performers are: AVCO Everett Research Laboratory, Everett, Massachusetts; ITEK Corporation, Lexington, Massachusetts; Analytic Decisions, Inc., Arlington, Virginia; Optical Science Consultants, Yorba Linda, California; and Scripps Institute of Oceanography, San Diego, California. In addition, two percent of the effort is provided by Government in-house activities at the Rome Air Development Center, Griffiss Air Force Base, New York.

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I. PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 1982 Accomplishments: The key accomplishment was integration and successful test of the Compensated Imaging (CI) field unit on the ~~large 1.6 meter telescope~~ at the ARPA Maui Optical Station (AMOS)/Maui Optical Tracking and Identification Facility (MOTIF). This was a first time demonstration of large aperture real-time adaptive optics and serves to greatly increase confidence in the technology required by future adaptive optics laser systems. In addition, several space objects have been imaged

2. FY 1983 Program: The Laser Beam Director facility at AMOS is being used for laser ranging and illumination tests by other government agencies. Laser beam experiments are being performed in support of DARPA Directed Energy Office programs. A capability for the 1.6 meter telescope utility assessment is being completed. Infrared signature measurements are being made for the USAF Anti-Satellite (ASAT) program. DARPA performance evaluation and USAF operational evaluation of the CI field unit on the 1.6 meter telescope at AMOS is being completed.

3. FY 1984 Planned Program: Compensated Imaging System (CIS) operating procedures will be finalized with USAF Strategic Air Command/Aerospace Defense Command (SAC/ADCOM). This facility will provide the USAF, with real-time high quality optical imagery. Together with the previously capability at AMOS/MOTIF, this will provide significantly improved characterization of near earth orbit satellites ~~in fulfillment of the Space Object Identification function of ADCOM.~~ The CIS, Laser Beam Director, and capabilities at AMOS will be transitioned to USAF for use as a national facility for experimentation in areas such as: space surveillance, laser beam measurements.

4. Program to Completion: Transition of project to USAF

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5. Milestones:

<u>Last Year's Report Plan</u>	<u>Current Plan</u>	<u>Milestones</u>
Uncertain	Late FY 1982	Completed acceptance testing of Compensated Imaging (CI) Charge Coupled Device (CCD) camera.
Early FY 1982	No Change	Completed integration of CI Field unit with ARPA Maui Optical Station (AMOS) telescope.
Mid FY 1982	No Change	Completed feasibility demonstration of CI field unit.
--		Complete transition of AMOS/CI to USAF.

6. Explanation of Milestone Changes: Resolution of problems delayed in
 definitizing the milestone for completing acceptance testing of the Compensated Imaging (CI) CCD camera.